

Knowledge, beliefs and practices on antibiotic use and resistance among a group of trainee nurses in Sri Lanka

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Abstract

This study was conducted to identify the level of knowledge, attitudes and practices on antibiotic use and antibiotic resistance (ABR) among student nurses.

This descriptive cross sectional study used a self-administered questionnaire that included sections on knowledge and practices that contributing to antibiotic resistance (ABR).

Knowledge score ranged from 100% to 33.3% with a mean of 71.9% (SD 14) and 115 (57.8%) had above average marks. While the majority defined ABR correctly, 17 (10.6%) of the participants defined it as humans becoming resistant to antibiotics.

Health education (20.9%), infection control (41.9%) and antibiotic stewardship (17.8%) were identified by the study participants as areas that nursing officers can get involved to minimize the emergence and spread of antibiotic resistance.

Our findings indicated that knowledge, attitudes and practices of nursing students need to be improved with targeted educational programmes, considering their key role in combating antibiotic resistance.

Background and Objectives

Nurses place a crucial role in combating antimicrobial resistance. They play key roles in antibiotic stewardship and infection control, two main preventive measure of antibiotic resistance. Furthermore, they are one of the main sources for health education to patients and community. Knowledge and necessary attitudes for this role should be inculcated to nurses during their training period itself. Therefore, identifying the level of knowledge and perceptions among nursing students, and the gaps will enable strengthening of nursing curricula and training programmes.

Majority of the nurses working in the public hospitals of Sri Lanka are trained by government nursing schools, run by the Ministry of Health, Sri Lanka, while the Faculties of Allied Health Sciences contribute to a lesser proportion of the workforce. Curricula of the nursing schools remain similar across the government nursing schools in Sri Lanka. Thus, this study was conducted with the aim of identifying the level of knowledge, beliefs and practices of nursing students at a government nurses training school in Sri Lanka.

Methodology

Design: Cross sectional, descriptive study.

Settings: A Government Nurses' Training School in the North Western Province of Sri Lanka

Ethical considerations: Ethical clearance was obtained from the ethics review committee of Faculty of Allied Health Sciences, University of Peradeniya, Sri Lanka. Informed written consent was obtained from participants.

Participants: All trainee nurses studying in the year 2018.

Methods: A convenient sampling method was used. Age, sex, study stream for advanced level examination and the year of study were collected as independent variables.

Study instrument: A pre-validated self-administered questionnaire was used to collect data. The questionnaire contained sections on knowledge (12 questions), beliefs and practices about the appropriate use of antibiotics, and antibiotic resistance.

Data analysis: All data were entered into Microsoft Excel datasheet and analysed using SPSS 22nd version.

Questions on knowledge were marked to see whether the given answers are correct. Mean and median scores were calculated and compared for the two genders using Mann-Whitney U test and across the study years using the Kruskal Wallis test. Percentage giving correct answers were calculated and presented descriptively.

For questions related to beliefs and practices, percentages for different categories of answers were calculated. These were compared across the study years using Chi square test.

A qualitative approach with thematic analysis was conducted to analyze data that were qualitative in nature. All data were manually inspected to identify common themes and proportions expressing similar ideas were calculated.

Results

Study population

Number recruited: 199 nursing students

Females: 178 (89.5%), Males: 21 (10.5%)

Advanced level study stream: 199 (100%) biological sciences

Study year : 1st year - 78 (39%)

2nd year - 61 (30.5%)

3rd year - 60 (30%)

All participants had started their clinical training

Awareness about antibiotic resistance

193 (97%) had heard about antibiotic resistance.

Of the 193 who stated they had heard about antibiotic resistance, 161 had defined it using their own terms (Table 1).

Table 1: Participant awareness about antibiotic resistance

Theme	No (%)*
Bacteria not responding to antibiotics	65 (40.4%)
Bacteria resisting the activity of antibiotics	40 (24.8%)
Bacteria act against antibiotics	9 (5.6%)
Expected action of antibiotic is not present	8 (5.0%)
Bacteria not destroyed by antibiotics	5 (3.1%)
Disease not resolving/delayed response to antibiotics	5 (3.1%)
Reduced effectiveness of antibiotics	5 (3.1%)
Antibiotics not working on patients	2 (1.2%)
Adaptation to antibiotic treatment	1 (0.6%)
Humans become resistant to antibiotics	17 (10.6%)
Body's ability to fight against bacterial infections	3 (1.9%)
Not having any antibiotics to treat bacterial infections	1 (0.6%)

Knowledge on antibiotic resistance

- A total knowledge score % was calculated using the 12 questions in this section and marks ranged from 100% to 33.3% with a mean score of 71.9% (SD 14).
- Considering 72 as the average mark, 115 (57.8%) had above average marks.
- The mean knowledge score among females was 71.5% (SD 14.4) while the median was 75.
- Among males, the mean knowledge score was 75% (SD 9.8) while the median knowledge score was 75 and the difference between the two sexes was not significant ($p=0.35$, Mann-Whitney U test).
- The mean knowledge score among the 1st year students was 74.9 (SD 13.5) while the median was 75. For the 2nd years, the mean knowledge score was 70.9 (SD 15.8) while the median knowledge score was 75. The mean knowledge score among third year students was 69.0 (SD 12) while the median knowledge score was 66.7. The difference was statistically significant ($p=0.018$, Kruskal Wallis test).

Analysis of individual items is given in Table 2.

Table 2: Analysis of individual items assessing knowledge

Question	Correct answer (n %)
An antibiotic is active against virus	130(65.3%)
An antibiotics is active against bacteria	182(91.5%)
An antibiotic is active against fungi	149(74.9%)
An antibiotic is active against protozoa	155(77.9%)
Any antibiotic is active against any type of bacteria	144(72.4%)
Antibiotics are indicated for common cold	119(59.8%)
Antibiotics are indicated for all types of diarrhoea	158(79.4%)
Inappropriate use of antibiotics can lead to antibiotic resistance	147(73.9%)
Genes responsible for resistance can spread from one bacteria to another	88(44.2%)
Strengthening infection control measures can reduce the spread of antibiotic resistance	142(71.4%)
Hand washing can prevent the spread of resistant bacteria	123(61.8%)
Antibiotics have no side effects	180(90.5%)

Attitudes and beliefs on antibiotic use and resistance

Seventy four (37.2%) and 79 (39.7%) believed that taking antibiotics during a cold will prevent the disease from getting worse or help them recover faster, respectively (Table 3). Interestingly, there was a significant difference in the proportion of students agreeing to these two statements across the study years.

Medication practice on antibiotic use

This section inquired mainly about personal medication use and some practices related to patient care (Table 4).

Table 3: Table 3: Summary of responses – attitude towards antibiotic use and antibiotic resistance

Question	Percentage agreeing				
	Overall (n, %)	1 st year	2 nd year	3 rd year	Significance
When I have a cold I should take antibiotics to prevent it from getting worse	74(37.2%)	19 (24.4%)	28 (45.9%)	27 (45%)	0.01
When I get any fever, antibiotics help me to get better more quickly	43 (21.6%)	15 (19.2%)	12 (19.7%)	16 (26.7%)	0.52
I believe that antibiotics cure my cold faster	79 (39.7%)	43 (55.1%)	16 (26.2%)	20 (33.3%)	0.001
I would stop taking the prescribed antibiotics if I feel better	64(72.2%)	20 (25.6%)	24 (39.3%)	20 (33.3%)	0.23
If antibiotics are taken for long time, bacteria become more resistant to antibiotics	177(88.5%)	72 (92.3%)	54 (88.5%)	51 (85.0%)	0.39
If antibiotics are taken less than the prescribed dose bacteria become less resistant to antibiotics	55(27.6%)	22 (28.2%)	9 (14.8%)	24 (40.0%)	0.008

Table 4: Summary of responses related to medication practice

Question	Always (n %)	Sometimes (n %)	Never (n %)
Personal use related			
Do you consult a doctor before starting an antibiotic	116(58.3%)	83(41.7%)	0
Do you prefer to take an antibiotic when you have cough	7(3.5%)	106(53.3%)	86(43.2%)
Do you use the antibiotics for shorter than standard duration	0	111(55.8%)	88(44.2%)
Patient care related			
Do you take specimens for culture before the patient is being given antibiotics	78(39.2%)	79(39.7%)	42(21.1%)
Do you check the expiry date of antibiotic before using it	111(55.8%)	72(36.2%)	16(8.0%)

On being asked the course of action following rapid recovery since starting an antibiotic, 44 (22.1%) stated that they would stop taking further treatment, 54 (27.1%) stated that they save the remaining antibiotics for another time and 103 (51.8%) stated that they would complete a full course of antibiotics.

Furthermore, 124 (62.3%) of the study participants stated that they discard leftover antibiotics while 48 (24.1%) stated that they would give leftover antibiotics to friends.

Ideas on possible role of nursing officers on preventing antibiotic resistance

This was assessed by the open ended question "Write in your own word, in any language that you prefer two things that you as a nursing officer can do to minimize the emergence and spread of resistant organisms".

The total number of possible actions to be taken given by the participants was 191.

These could be categorized in to give broad themes

- Infection control (80, 41.9%),
- Antibiotic stewardship (34, 17.8%)
- Health education (40, 20.9%)
- Personal behavior related (20, 10.5%)

Discussion and conclusions

We found that while there is satisfactory knowledge among the nursing students studied, there is a gap in their practices. Also, despite the higher knowledge score, there were misunderstandings in some of the fundamental issues pertaining to antibiotic use and resistance.

Our study was conducted at a single nurses training school in Sri Lanka. However, the curricula remain the same across all the government training schools and the training given also is very similar. We did not inquire the source for the information they received and also whether they had any formal teaching on antibiotic resistance.

We recommend that the curriculum of the government nurses training school should be strengthened to empower nursing officers with sufficient knowledge to make a satisfactory contribution to face this global crisis. Furthermore, special programmes need to be implemented to minimize the gap between knowledge and practices.